
A December Effect with Tax-Gain Selling?

Honghui Chen and Vijay Singal

We present evidence on the December effect. When investors do not sell winner stocks in December but postpone their sale to January so that capital gains will not be realized in the current fiscal year, the “winners” appreciate in December. The December effect is relatively easy to arbitrage. We also present evidence regarding the persistence of the January effect and note that the January effect continues because it is difficult to exploit profitably.

The January anomaly has been known to academics, practitioners, and investors for decades. The primary explanation for the existence of the January effect is tax-loss selling. Because investors must pay taxes on *net* capital gains, investors will sell losers toward the end of the year to realize capital losses that can offset capital gains. Thus, past “losers” experience abnormal selling pressure in December as a result of tax-loss selling, which is relieved in January and results in large January gains for losers. Evidence of large January returns for losers has been dubbed “the January effect.”

Another activity driven by the tax code that has not received attention is tax-gain selling. If investors realize capital losses to offset capital gains, it is also natural for them to postpone realization of capital gains so that they can postpone payment of taxes on capital gains. Thus, rational investors sell winners in January instead of December. By waiting a few days, they can defer payment of taxes by almost one year. The selling pressure on winners should be small in December, causing the price of winners to rise. We term the incidence of large December returns for winner stocks “the December effect.” Both tax-loss selling (causing the January effect) and tax-gain selling (causing the December effect) are consistent with the tax-based model of Constantinides (1984).

This article serves several purposes: (1) to document the existence of tax-related selling that causes the December and January effects, (2) to explain the reasons for the existence of the effects, (3) to examine the persistence of the effects, and (4) to investigate trading strategies to take advantage of the two effects.

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The Study

The initial sample for the study reported here consisted of common stocks traded on the NYSE, Amex, and Nasdaq exchanges. Return data are from the daily and monthly stock files maintained by the Center for Research in Security Prices (CRSP). Our study covers the period January 1963 through December 2001.

Returns and Turnover by Month. For each month from 1963 through 2001, we categorized all companies into size deciles based on market capitalizations at the end of the previous month. Within each size decile, we formed return quartiles based on the price drop from the maximum price attained over the previous 11 months to the price at the end of the preceding month. Companies in the smallest size decile and the lowest return quartile within that decile are called “small loser companies” (“small losers”). Companies in the largest size decile and the highest return quartile within that decile are called “large winner companies” (“large winners”). The average daily returns for small losers and large winners by month for the entire 1963–2001 period are reported in **Table 1**. Also included for comparison are returns for the nearest size deciles and value-weighted as well as equally weighted returns for the universe of stocks.

Contrary to press reports, the December return for the full sample of companies is similar to the return in other months:¹ We found no evidence of a broad-based December rally. The value-weighted daily return in December is 0.055 percent, compared with 0.070 percent in January and 0.072 percent in November. The returns in April, August, and October are also at least as large as those in December. The equally weighted daily return in December is 0.056 percent, the third lowest among all months and larger than only the returns in March and May.

Table 1. Daily Returns in Percentages by Month, 1963–2001
(*p*-values in parentheses)

Size Decile	Return Quartile	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
<i>Small losers</i>														
1	1	1.029 (0.000)	0.192 (0.023)	0.052 (0.421)	0.025 (0.707)	0.007 (0.904)	-0.050 (0.364)	-0.029 (0.628)	-0.088 (0.154)	-0.050 (0.459)	-0.143 (0.042)	-0.183 (0.037)	-0.202 (0.032)	0.045 (0.085)
2	1	0.616 (0.000)	0.003 (0.968)	-0.050 (0.384)	-0.097 (0.133)	-0.071 (0.216)	-0.130 (0.010)	-0.122 (0.027)	-0.154 (0.025)	-0.178 (0.039)	-0.247 (0.002)	-0.189 (0.017)	-0.220 (0.010)	-0.071 (0.002)
<i>Large winners</i>														
9	4	0.016 (0.683)	0.052 (0.132)	0.013 (0.758)	0.050 (0.119)	0.013 (0.673)	0.011 (0.663)	-0.008 (0.785)	0.017 (0.678)	0.011 (0.724)	-0.037 (0.487)	0.075 (0.043)	0.113 (0.000)	0.027 (0.008)
10	4	0.008 (0.827)	0.043 (0.167)	0.010 (0.789)	0.039 (0.188)	0.012 (0.682)	0.016 (0.495)	0.000 (0.999)	0.011 (0.769)	-0.011 (0.708)	0.002 (0.969)	0.077 (0.021)	0.090 (0.002)	0.025 (0.010)
<i>Small winners</i>														
1	4	0.295 (0.000)	0.088 (0.055)	0.038 (0.225)	0.008 (0.861)	-0.014 (0.742)	-0.031 (0.416)	0.005 (0.877)	-0.022 (0.539)	-0.017 (0.660)	-0.090 (0.030)	-0.075 (0.062)	-0.093 (0.019)	0.007 (0.577)
2	4	0.200 (0.000)	0.071 (0.119)	0.026 (0.432)	0.016 (0.698)	0.002 (0.964)	-0.014 (0.632)	-0.009 (0.784)	-0.001 (0.984)	0.006 (0.852)	-0.084 (0.063)	-0.023 (0.605)	-0.005 (0.881)	0.015 (0.183)
<i>Large losers</i>														
9	1	0.134 (0.041)	-0.009 (0.887)	0.034 (0.471)	0.028 (0.609)	0.004 (0.934)	-0.030 (0.473)	-0.058 (0.294)	0.007 (0.911)	-0.113 (0.104)	-0.089 (0.203)	0.057 (0.390)	0.067 (0.076)	0.002 (0.884)
10	1	0.111 (0.060)	-0.026 (0.669)	0.023 (0.564)	0.049 (0.284)	0.015 (0.686)	-0.002 (0.958)	-0.034 (0.447)	0.043 (0.439)	-0.084 (0.186)	-0.020 (0.734)	0.057 (0.359)	0.058 (0.055)	0.016 (0.279)
<i>Equally weighted sample</i>		0.101	0.074	0.041	0.070	0.053	0.057	0.056	0.065	0.056	0.061	0.075	0.056	0.065
<i>Value-weighted sample</i>		0.070	0.048	0.034	0.057	0.047	0.041	0.049	0.055	0.040	0.063	0.072	0.055	0.053

Note: The *p*-values tested whether the mean is different from zero.

The returns for our select groups are more interesting. On average, the small losers (1,1) earned significantly positive returns only in January and February; returns were significantly negative in October, November, and December. In fact, the January return was 1 percent a day, a gain of more than 20 percent for the month, compared with a loss of 4 percent for December. In contrast, the large winners (10,4) gained significantly only in November and December. For the remaining months of the year, the returns are not significantly different from zero. The return in December is about 2 percent for those companies. For both small losers and large winners, the differences between December and January returns are statistically significant. The median returns (not reported) were similar in magnitude, suggesting that outliers were not driving the results.

Note that the same set of companies is not being compared between any two months because the portfolios were reconstructed at the end of each month. Table 1 and the next table are intended to give an overview of the return and turnover by month. In later tables, we do report returns for portfolios held constant across December and January.

Table 1 also reports the returns for small winners (1,4) and large losers (10,1) and their nearest size deciles. Note that the large losers gained more in January than in December, exactly the opposite of the pattern for the large winners, which gained more in December than in January. In contrast, returns for the small winners acted much like those for the small losers, although the small losers gained significantly more in January and lost significantly more in December than the small winners. Because return quartiles were formed with each size decile, the sample of small winners may contain a large fraction of losers. For this reason, our subsequent and more focused analysis did not explicitly control for size.

Volume turnover by different categories of stocks is reported in **Table 2**, where turnover is measured as the number of shares traded daily divided by the total number of outstanding shares. If tax-related selling causes the abnormal returns for winners and losers, then the volume of trading should also follow a pattern. We expected the turnover of losers to be greater in December, when more people want to sell losers, and the turnover of winners to be greater in January, when more investors are inclined to sell winners.

Table 2 shows that the mean daily turnover for small loser (1,1) stocks was 0.302 percent in December, which is greater than the turnover in all other months. In particular, the turnover of 0.235 percent for small losers in January is about 20 percent *less*

than the turnover in December.² The December turnover for large winners (10,4) is among the lowest, whereas the January turnover is among the highest of all calendar months. In contrast to the small losers, the January turnover for the large winners (0.242 percent) is about 20 percent *more* than the December turnover (0.206 percent). The December turnover is statistically different from the January turnover for both small losers and large winners.³

The return and turnover patterns suggest that small losers and large winners behave differently. The higher returns in December coupled with higher turnover in January for the large winners are consistent with the December effect. At the same time, the higher returns in January coupled with higher turnover in December for the small losers are consistent with the January effect.

Evidence relating to the December effect presented here is new and has not been well documented in the past. In general, previous research has not found any significant differences for winners or large-capitalization stocks in December. For example, Rogalski and Tinic (1986) did not find that large companies earn significantly different returns in December from their returns in other months. Similarly, Ritter (1988), Reinganum (1983), and Sias and Starks (1997) found no evidence of a December effect. Dyl (1977) reported that the monthly volume of winners was abnormally low in December for his sample, but he found no evidence of abnormal volume in January either for winners or for losers.

Returns and Turnover around the Turn of the Year. Tables 1 and 2 depict the returns by month as an aggregate over the entire sample period. Now, we view the results from a closer angle—around the turn of each year and by year. Because the primary explanation for the December and January effects is tax-related selling, we identified stocks by measuring each stock's potential for tax-related selling (PTS). We used raw stock returns in all measures of PTS, instead of risk-adjusted stock returns, because taxes are based on actual loss/gain, not on risk-adjusted loss/gain. In accordance with previous work, we measured PTS as the percentage decline from the highest price attained during the year to the reference day (see Reinganum; Lakonishok and Smidt 1986; Jones, Lee, and Apenbrink 1991).⁴ The reference day was the 12th last trading day of the year, and the reference price was the price on that day. Winners were defined as stocks in the smallest PTS decile (stocks with the smallest price decline from the high price); losers were stocks in the highest PTS decile (stocks with the largest price decline from the high price). The size restriction used in Tables 1 and 2 was removed

Table 2. Daily Turnover in Percentages by Month, 1963–2001
(*p*-values in parentheses)

Size Decile	Return Quartile	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
<i>Small losers</i>														
1	1	0.235 (0.000)	0.199 (0.000)	0.180 (0.000)	0.179 (0.000)	0.185 (0.000)	0.171 (0.000)	0.157 (0.000)	0.153 (0.000)	0.181 (0.000)	0.183 (0.000)	0.209 (0.000)	0.302 (0.000)	0.195 (0.000)
2	1	0.178 (0.000)	0.172 (0.000)	0.169 (0.000)	0.167 (0.000)	0.163 (0.000)	0.154 (0.000)	0.141 (0.000)	0.142 (0.000)	0.155 (0.000)	0.159 (0.000)	0.186 (0.000)	0.248 (0.000)	0.170 (0.000)
<i>Large winners</i>														
9	4	0.246 (0.000)	0.252 (0.000)	0.251 (0.000)	0.234 (0.000)	0.231 (0.000)	0.226 (0.000)	0.220 (0.000)	0.196 (0.000)	0.216 (0.000)	0.229 (0.000)	0.209 (0.000)	0.203 (0.000)	0.226 (0.000)
10	4	0.242 (0.000)	0.236 (0.000)	0.245 (0.000)	0.234 (0.000)	0.221 (0.000)	0.206 (0.000)	0.216 (0.000)	0.201 (0.000)	0.221 (0.000)	0.233 (0.000)	0.217 (0.000)	0.206 (0.000)	0.223 (0.000)
<i>Small winners</i>														
1	4	0.141 (0.000)	0.149 (0.000)	0.140 (0.000)	0.136 (0.000)	0.132 (0.000)	0.126 (0.000)	0.127 (0.000)	0.125 (0.000)	0.126 (0.000)	0.127 (0.000)	0.115 (0.000)	0.134 (0.000)	0.131 (0.000)
2	4	0.167 (0.000)	0.166 (0.000)	0.154 (0.000)	0.153 (0.000)	0.155 (0.000)	0.141 (0.000)	0.144 (0.000)	0.131 (0.000)	0.147 (0.000)	0.136 (0.000)	0.136 (0.000)	0.139 (0.000)	0.147 (0.000)
<i>Large losers</i>														
9	1	0.350 (0.000)	0.327 (0.000)	0.315 (0.000)	0.327 (0.000)	0.314 (0.000)	0.316 (0.000)	0.300 (0.000)	0.294 (0.000)	0.316 (0.000)	0.346 (0.000)	0.321 (0.000)	0.340 (0.000)	0.322 (0.000)
10	1	0.315 (0.000)	0.303 (0.000)	0.299 (0.000)	0.309 (0.000)	0.285 (0.000)	0.292 (0.000)	0.279 (0.000)	0.267 (0.000)	0.292 (0.000)	0.315 (0.000)	0.295 (0.000)	0.303 (0.000)	0.296 (0.000)
<i>Equally weighted sample</i>		0.212	0.212	0.203	0.204	0.195	0.189	0.180	0.176	0.191	0.195	0.191	0.210	0.196
<i>Value-weighted sample</i>		0.238	0.229	0.227	0.232	0.213	0.209	0.204	0.200	0.221	0.236	0.217	0.217	0.220

Note: See note to Table 1.

to allow an unconstrained formation of portfolios of winners and losers.

For all December–January observation periods, we used the same set of stocks in December and the following January. For example, for year 2000, the portfolio of winners was formed on the 12th last trading day of 2000 and the same portfolio was used for January 2001. Because our dataset stopped at the end of 2001, the results are reported through January 2001 in **Table 3** for winners (bottom PTS decile companies) in five-year periods until 1987 and annually for the most recent period. We will concentrate on the more recent period because it is likely to be of most interest to readers and because of the Tax Reform Act of 1986, which required all mutual funds to use an October tax year end. Thus, where trading by mutual funds is concerned, any year-end tax effect has moved from December–January to October–November. For individual investors, however, the December–January period continues to be the relevant period.

The bottom cell of the PTS column in Table 3 reveals that the winners fell only 2.4 percent from the highest price achieved during the year for the 1963–2000 period. In 2000, the average price drop for winners was only 1.8 percent from the highest price. In general, winners were high-priced stocks but not necessarily the largest stocks by market cap. For 2000, for example, the median reference price was \$24.47, the mean market cap (not shown in Table 3) was \$4,125 million, and the median market cap was about \$398 million.

Consider now the returns and turnovers for five-day periods in December (excluding the last trading day) and in January.⁵ The mean return in the five-day December period for 2000 was about 6.5 percent. Compared with the gain in December, these stocks lost about 3.6 percent in the first five days of the following January (2001).

In general, the volume for the winners is significantly lower in December than in January, which is in accordance with postponement of tax-gain selling to January. The volume turnover for the five-day January period in 2001 of about 2.2 percent is approximately 25 percent *higher* than the turnover of 1.7 percent in the last five days of December 2000.

Overall, note from the top six rows that the five-day December and five-day January returns were not significantly different until 1987, although the turnover was significantly larger for the five-day January period than for the corresponding December period for these winners. After 1988, however, the return for winners was 3.0 percent greater for the five-day December period than for the five-day January period and the turnover was

more than 40 percent greater for the five-day period in January than for the five-day period at the end of December. Explaining why the December effect did not appear in the earlier years is not easy, although we have another piece of evidence *consistent with* the December effect in the 1963–87 period: The turnover in January was significantly higher than in December (by about 30 percent), which is consistent with tax-gain selling in January. Nonetheless, caution must be exercised in interpreting the December effect.

The characteristics of losers are presented in **Table 4** in a manner similar to that of Table 3. For the whole sample period, losers fell about 65 percent from the highest price achieved during the year. These stocks have low prices and low market caps. For 2000, for example, the median reference price was \$1.14, the mean market cap (not shown) was \$108 million, and the median market cap was \$26 million. The five-day January returns were large throughout the 1963–2000 period. Until 1987, the return in the first five days of January was about 7.9 percent, which is significantly larger than the return in December. For 1988–2000, the five-day January return continued to be large—almost 12 percent—and statistically significant. The volume turnover was about 35 percent smaller in January than in December. For 2000, the turnover was about 45 percent less in January than in December.

A comparison of Tables 3 and 4 reveals striking differences. On the one hand, the winners gained in December and had significantly lower turnover in December, which caused the December effect that is consistent with tax-gain selling in January. On the other hand, the losers gained in January with a significantly lower turnover, which caused the January effect that is consistent with tax-loss selling. The monthly results for the full sample period are compared in **Figure 1**, and the turn-of-the-year return differences are depicted in **Figure 2**.

In **Table 5**, as a follow-up to Tables 1 and 2, we report returns and turnover for winners in December and January with the set of stocks held constant. As in Tables 1 and 3, the December return for the winners in 1988–2000 is significantly larger than the January return. The difference of 0.12 percent a day for December is approximately 2.5 percent for the whole month. Table 3 reported the five-day December return to be about 3 percent higher than the five-day return in January, implying that the difference in performance is concentrated in the 10 days around the turn of the year. Furthermore, as in Tables 1 and 3, Table 5 also reveals that the mean daily volume turnover for winners is significantly higher in January than in December, which is consistent with tax-gain selling of winners.

Table 3. December Effect for Winners: Around End of Year
(*p*-values in parentheses)

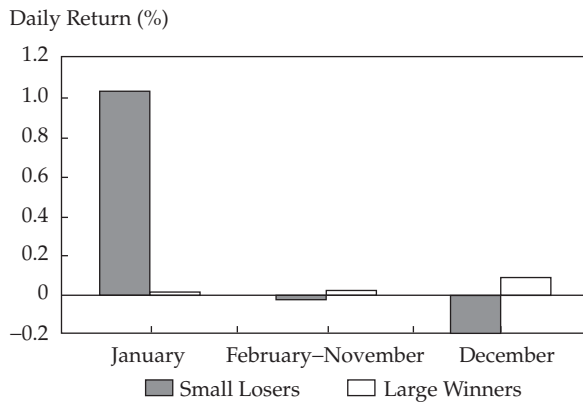
Period	PTS	Median Price	Median Size (millions)	Mean Size Decile	Std	Mean Dec 5-Day Return	Mean Jan 5-Day Return	Jan 5-Day Return – Dec 5-Day Return	Mean Dec 5-Day Turnover	Mean Jan 5-Day Turnover	Jan 5-Day Turnover – Dec 5-Day Turnover	No. of Obs.
1963–67	0.012	\$38.00	\$89.76	6.84	8.570%	–0.097%	0.713%	0.809%	0.912%	1.226%	0.315%	973
1968–72	0.015	40.63	206.11	7.57	9.270	–0.007	–0.323	–0.316	0.854	0.940	0.086	1,070
1973–77	0.058	15.00	25.02	6.19	11.788	1.077	0.707	–0.371	0.544	0.762	0.219	2,324
1978–82	0.018	18.41	38.16	5.77	10.863	0.513	0.516	0.003	0.694	0.948	0.298	2,212
1982–87	0.038	23.88	91.53	6.77	9.908	–0.005	1.363	1.368	0.680	0.871	0.191	2,784
1963–87	0.029 (0.003)	24.31	62.75	6.61	10.019	0.284 (0.233)	0.591 (0.173)	0.307 (0.494)	0.748 (0.000)	0.975 (0.000)	0.228 (0.001)	25 yrs
1988	0.012	17.25	71.45	6.53	11.603	0.455	0.799	0.344	0.732	0.984	0.252	564
1989	0.005	22.25	175.90	7.23	10.502	1.570	–0.252	–1.822	0.661	0.897	0.236	548
1990	0.036	22.75	221.14	7.60	10.593	–0.117	–3.636	–3.519	0.686	1.116	0.431	535
1991	0.008	22.44	118.12	6.65	11.739	4.782	1.437	–3.345	0.984	1.452	0.468	526
1992	0.006	24.00	167.49	6.87	10.426	1.429	–0.643	–2.072	0.898	1.346	0.446	524
1993	0.015	21.50	141.34	6.47	11.295	0.976	0.197	–0.779	0.838	1.325	0.486	553
1994	0.034	22.00	147.08	6.59	11.151	1.125	–0.558	–1.683	1.366	1.541	0.174	598
1995	0.002	27.50	331.37	7.29	9.886	1.787	–1.125	–2.912	1.105	1.429	0.325	619
1996	0.011	22.00	158.21	6.20	9.466	1.075	0.377	–0.698	1.031	1.420	0.389	642
1997	0.006	33.00	323.61	6.99	8.026	1.944	–2.641	–4.585	0.788	1.237	0.449	673
1998	0.037	31.88	721.05	7.65	11.215	2.620	0.598	–2.022	1.610	2.459	0.849	646
1999	0.021	23.91	243.65	6.37	15.921	3.961	–1.967	–5.928	2.061	2.926	0.863	602
2000	0.018	24.47	397.95	7.12	10.794	6.479	–3.663	–10.143	1.712	2.198	0.487	578
1988–00	0.016 (0.000)	22.75	175.90	6.89	10.971	2.161 (0.001)	–0.852 (0.090)	–3.013 (0.002)	1.113 (0.000)	1.564 (0.000)	0.450 (0.000)	13 yrs
1963–00	0.024 (0.000)	23.95	113.84	6.71	10.344	0.926 (0.002)	0.097 (0.773)	–0.829 (0.081)	0.873 (0.000)	1.177 (0.000)	0.304 (0.000)	38 yrs

Note: Market cap is end-of-the-year cap. The five-day December return is the buy-and-hold return over the sixth last trading day through the second last trading day of the year; the January five-day return is the return over the first five trading days of the next year. Standard deviation (Std) was estimated over the preceding 24–60 months of monthly returns (where available). When reporting the significance for a period, we first obtained the average over a year and then found the time-series average of these annual averages. Also see the note to Table 1.

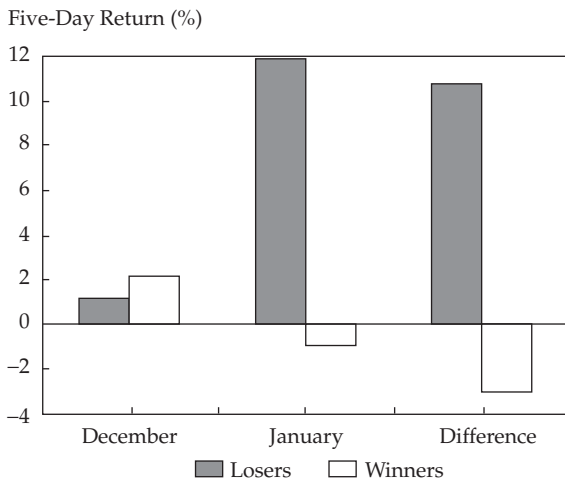
Table 4. January Effect for Losers
(*p*-values in parentheses)

Period	PTS	Median Price	Median Size (millions)	Mean Size Decile	Std	Mean Dec 5-Day Return	Mean Jan 5-Day Return	Jan 5-Day Return – Dec 5-Day Return	Mean Dec 5-Day Turnover	Mean Jan 5-Day Turnover	Jan 5-Day Turnover – Dec 5-Day Turnover	No. of Obs.
1963–67	0.463	\$5.50	\$7.50	2.97	14.165%	-0.011%	9.340%	9.351%	1.227%	0.928%	-0.301%	974
1968–72	0.575	7.25	12.53	3.04	16.425	1.024	8.199	7.175	1.588	1.147	-0.441	1,069
1973–77	0.641	2.00	3.90	3.30	19.509	3.009	9.596	6.587	0.850	0.499	-0.352	2,269
1978–82	0.596	2.25	6.46	3.08	21.046	2.093	4.717	2.624	1.136	0.969	-0.146	2,210
1982–87	0.736	1.00	6.10	2.77	22.886	1.044	7.876	6.832	1.112	0.786	-0.325	2,576
1963–87	0.600 (0.000)	2.75	5.88	3.03	18.591	1.440 (0.019)	7.850 (0.000)	6.409 (0.000)	1.209 (0.000)	0.873 (0.000)	-0.336 (0.000)	25 yrs
1988	0.707	0.69	4.28	2.55	21.890	2.869	6.888	4.019	1.121	0.685	-0.438	566
1989	0.720	0.66	4.74	2.57	21.909	1.859	6.530	4.671	1.289	0.698	-0.593	551
1990	0.831	0.50	4.35	2.81	21.327	-1.483	7.145	8.628	1.176	0.569	-0.607	534
1991	0.719	0.69	4.87	2.66	23.579	4.900	18.271	13.371	1.285	1.001	-0.282	526
1992	0.721	1.25	8.96	2.92	26.254	2.988	9.741	6.753	1.598	1.234	-0.364	524
1993	0.656	2.00	14.85	2.97	26.424	3.493	9.210	5.717	2.019	1.502	-0.520	555
1994	0.746	1.50	12.59	2.83	24.832	-0.493	10.748	11.242	1.866	1.179	-0.685	598
1995	0.663	1.75	13.73	2.69	22.480	0.523	10.104	9.581	2.326	1.292	-1.034	619
1996	0.717	1.88	18.31	2.88	24.244	-4.178	13.692	17.870	2.513	1.923	-0.591	642
1997	0.734	1.69	21.35	2.95	23.030	-3.431	10.659	14.089	3.611	2.460	-1.152	671
1998	0.810	1.50	17.50	3.03	23.070	3.311	16.112	12.801	3.586	2.762	-0.824	646
1999	0.722	2.94	36.72	3.59	22.341	5.137	7.946	2.809	5.613	3.256	-2.358	602
2000	0.931	1.14	26.05	3.44	35.650	-1.035	28.007	29.041	4.631	2.380	-2.251	578
1988–00	0.745 (0.000)	1.50	13.73	2.91	24.387	1.112 (0.212)	11.927 (0.000)	10.815 (0.000)	2.510 (0.000)	1.611 (0.000)	-0.900 (0.000)	13 yrs
1963–00	0.650 (0.000)	1.75	7.30	2.99	20.574	1.328 (0.007)	9.245 (0.000)	7.917 (0.000)	1.654 (0.000)	1.125 (0.000)	-0.529 (0.000)	38 yrs

Note: The sample consists of the top PTS decile stocks (losers). The five-day December return is the buy-and-hold return over the sixth last trading day through the second last trading day of the year; the January five-day return is the return over the first five trading days of the next year. See also notes to Tables 1 and 3.

Figure 1. Daily Returns for Large Winners and Small Losers by Month, 1963–2001

Note: Detailed results are in Table 1.

Figure 2. Turn-of-the-Year Five-Day December Returns and the Five-Day January Returns for Winners and Losers, 1988–2000

Note: Detailed results are in Table 3 and Table 4.

Alternative Explanations for December and January Effects

Until now, we have focused on tax-related selling as an explanation of the December effect. Because the December effect is in some ways similar to the January effect, we can examine alternative explanations for the January effect to see if they can explain the December effect.

Window Dressing. According to the window-dressing hypothesis, developed in Haugen and

Lakonishok (1988) and Lakonishok, Shleifer, Thaler, and Vishny (1991), institutional managers are evaluated on the basis of their performance. To improve their performance, they hold risky stocks and small-cap stocks that are likely to provide high returns, but they sell them before the end of the year so that the stocks will not show up in their year-end holdings, when investors evaluate manager performance in light of the riskiness of their holdings. At the beginning of the following calendar year (in January), investment managers reverse the process by selling winners, large-cap stocks, and low-risk stocks while replacing them with small-cap and risky stocks that typically include many past losers. Thus, the predictions of window dressing are identical to those of tax-related selling and are consistent with the December and January effects.

Because the hypotheses of tax-related selling and window dressing have similar predictions for the turn-of-the-year period, disentangling the effects of one from the other is difficult. Chen and Singal (2003) relied on timing differences to distinguish among hypotheses. They reasoned that the window-dressing hypothesis predicts abnormal returns for certain stocks not only in January but also at other times during the year. For example, the Investment Company Act of 1940 requires semiannual submission of form N-SAR, which provides information about fees and performance to the U.S. SEC. In addition, the Investment Company Act of 1940 requires all mutual funds to file semi-annual reports with the SEC and send those reports to shareholders. Because no tax-related selling is likely to take place in June or July, if a pattern similar to the December–January pattern were found in June–July, it would be entirely the result of window dressing. Thus, Chen and Singal examined the return and turnover for five-trading-day periods at the end of June and beginning of July. They found no significant difference in either returns or turnover between the period at the end of June and the period at the beginning of July, which suggests that window dressing is unlikely to be the explanation of the December effect—or the January effect.

Other evidence is also inconsistent with the window dressing hypothesis, which implies that turnover for both losers and winners should be higher in December than in other months as institutions sell their losers and substitute them with winners. Tables 2–5 reveal higher volume in December only for losers, however, not for winners, and reveal higher volume in January for winners, not for losers.

Table 5. December Effect for Winners: December and January
(*p*-values in parentheses)

Period	PTS	Median Price	Median Size (millions)	Mean Size Decile	Std	Mean Dec Return	Mean Jan Return	Jan Return – Dec Return	Mean Dec Turnover	Mean Jan Turnover	Jan Turnover – Dec Turnover	No. of Obs.
1963–67	0.017	\$35.75	\$89.58	6.830	8.196%	0.081%	0.151%	0.071%	0.184%	0.174%	–0.010%	975
1968–72	0.018	38.88	198.91	7.500	9.180	0.099	–0.011	–0.110	0.201	0.190	–0.011	1,175
1973–77	0.047	15.13	28.69	6.270	11.918	0.011	0.198	0.187	0.119	0.148	0.029	2,258
1978–82	0.011	19.47	50.88	6.110	12.065	0.023	0.115	0.093	0.218	0.227	0.013	2,522
1982–87	0.040	23.94	91.40	6.610	9.817	0.029	0.217	0.191	0.161	0.174	0.013	2,576
1963–87	0.027 (0.003)	25.25	78.89	6.680	10.133	0.053 (0.141)	0.132 (0.009)	0.080 (0.190)	0.175 (0.000)	0.182 (0.000)	0.007 (0.305)	25 yrs
1988	0.015	17.50	73.77	6.510	10.927	0.059	0.192	0.141	0.152	0.170	0.019	560
1989	0.009	21.25	130.73	6.990	10.488	0.075	–0.325	–0.401	0.159	0.158	–0.001	549
1990	0.047	20.25	171.43	7.270	10.833	0.108	0.156	0.048	0.189	0.231	0.042	535
1991	0.011	17.88	66.81	6.200	10.886	0.216	0.169	–0.047	0.182	0.225	0.043	525
1992	0.000	21.69	194.28	6.970	12.156	0.156	0.198	0.042	0.300	0.335	0.036	524
1993	0.015	19.50	102.95	6.010	12.445	0.090	0.153	0.062	0.219	0.262	0.043	554
1994	0.027	20.56	135.43	6.410	11.605	0.039	0.008	–0.030	0.274	0.291	0.017	598
1995	0.001	27.75	309.34	7.200	10.322	0.137	0.011	–0.125	0.304	0.305	0.001	618
1996	0.002	29.00	353.26	7.220	9.169	0.041	0.113	0.075	0.267	0.308	0.040	641
1997	0.006	30.25	330.95	6.910	8.439	0.233	–0.118	–0.354	0.227	0.240	0.013	671
1998	0.033	30.75	666.30	7.590	12.316	0.293	0.088	–0.208	0.459	0.535	0.077	645
1999	0.021	22.00	266.55	6.480	15.840	0.390	–0.054	–0.448	0.538	0.577	0.039	601
2000	0.021	24.88	672.21	7.370	10.188	0.286	–0.078	–0.368	0.333	0.356	0.023	578
1988–00	0.016 (0.001)	21.69	194.28	6.860	11.201	0.163 (0.000)	0.040 (0.371)	–0.124 (0.052)	0.277 (0.000)	0.307 (0.000)	0.030 (0.000)	13 yrs
1963–00	0.023 (0.000)	24.25	100.67	6.740	10.498	0.091 (0.002)	0.100 (0.006)	0.010 (0.830)	0.210 (0.000)	0.225 (0.000)	0.015 (0.006)	38 yrs

Notes: The sample is the *bottom* PTS decile stocks (winners). The reference price is as of the last trading day of November in each year. Market cap is as of the end of November. Also see notes to Tables 1 and 3.

Information Hypothesis. The information hypothesis relies on how variation in the quantity of information available for different companies may result in different returns or levels of risk. According to Rozeff and Kinney (1976), the excess January returns are the effect of significant information releases that occur in the first few days of January. Barry and Brown (1984) suggested that companies with less information have higher perceived risk than companies with more information, even though the systematic risk of the two companies may be equal. If returns also depend on non-systematic risk, small companies that have less information may experience abnormal returns in January when new information is released, which reduces the level of information uncertainty about them. Barry and Brown found support for the hypothesis by using the period of listing as a proxy for availability of information. Like window dressing, the information effect should also exist around midyear, when earnings for the June-ending quarter are announced. Chen and Singal, however, found no significant difference in either returns or turnover between the five-trading-day period at the end of June and the five-trading-day period at the beginning of July, which suggests that the information hypothesis is unlikely to explain the January effect. Similarly, the information hypothesis cannot explain the December effect. Moreover, the information hypothesis is based on the behavior of the stock prices of small companies, whereas the December effect is essentially related to the behavior of large companies' stock prices.

Bid-Ask Bounce. Another explanation for the January effect is the bid-ask bounce. We showed that tax-loss selling in December will occur for stocks that experience a large decrease in value. A fall in value means that the company size (as measured by equity) has fallen and the stock price has decreased.⁶ Table 4 reveals that the median reference price for stocks with the greatest potential for tax-loss selling in the period studied (the losers in 2000) was \$1.14. Such market microstructure biases as the bid-ask bounce are most likely to plague stocks with low prices and low capitalization, exactly the types that meet the criteria for tax-loss selling.

Not surprisingly, researchers have suggested that various biases introduced by market microstructure might explain the January effect. Because trading in small companies is fraught with microstructure issues, researchers have attempted to discover whether the January effect is truly an anomaly or whether it is caused by biases, such as the bid-ask bounce, bid-ask spreads, and transac-

tion costs that make stock untradable. Ball, Kothari, and Shanken (1995) suggested that low-priced stocks trading within a relatively wide bid-ask interval may explain the January effect. Other studies have found that if midpoint prices instead of closing prices are used for computing returns, the January effect falls by about 25 percent. (We accounted for the impact of the bid-ask spread on returns in constructing the trading strategies reported in the next section.)

Based on the preceding evidence, we reached two conclusions. First, the primary explanation for the January effect is tax-loss selling of losers in December instead of January. Second, the only probable explanation for the December effect is tax-gain selling of winners in January instead of December. None of the other explanations considered for the January effect is a reasonable candidate for explaining the December effect.

Trading Strategies

The ultimate test of a pricing anomaly is whether a trading strategy based on it is profitable. Could the December or January effects have been profitably exploited had one known about them at the beginning of our sample period?⁷

December Effect. Table 1 shows that large winners gained 0.09 percent a day in the month of December, which is equivalent to about 2.0 percent for the month. If we consider the last five trading days of December 2000 from Table 3, the winners gained about 6.0 percent. On average, their return was 2.1 percent in the last five days of December in the 1988–2000 period. Because the shorter five-day period has a much larger daily return than the daily return for the entire month of December, we evaluated the *ex post* possibility of capturing the five-day December return.

The winners were usually large companies, so their bid-ask spreads were low. Table 3 shows that the median stock price was about \$24.47 for the single year 2000. A spread of 1/8 would translate into a percentage spread of 0.52 percent. Chalmers and Kadlec (1998) estimated the spreads for such stocks to be about 0.50 percent, whereas Knez and Ready's (1997) estimate was 0.58 percent. Thus, our estimated spread of 0.52 percent is a reasonable approximation. Furthermore, large-cap stocks are unlikely to be affected by large trades because they tend to be highly liquid. Therefore, a strategy of buying these stocks at the end of the seventh trading day prior to year-end and selling them five trading days later would be relatively easy; such a strategy would have provided an average return of approximately 1.6 percent over the five-trading-

day period, which is higher than 75 percent when annualized.

Other financial instruments that have lower trading costs could have been used to capture the December effect. Because the stocks affected by the December effect were large, the S&P 500 Index might have provided an efficient way to trade. S&P 500 Index futures can be traded at a cost of less than 0.1 percent. Similarly, SPDRs (Standard & Poor's Depository Receipts), which serve as an exchange-traded S&P 500 fund, have a round-trip transaction cost of about 0.1 percent. The returns from using S&P 500 futures and SPDRs (under the assumption that the total S&P 500 return reported by CRSP is equal to the return on SPDRs) are given in **Table 6**. For the 1988–2001 period, the December return would have been 2.64 percent if SPDRs had been used and 2.09 percent if futures had been used.⁸ For the five-day December period, Table 6 shows returns of 1.88 percent and 1.56 percent for, respectively, SPDRs and futures. Accounting for the trading cost of 0.1 percent, the net five-day December return when SPDRs were used would have been at least 1.5 percent for the 1988–2001 period. Clearly, a large return for a short period would apparently not have been difficult to earn.

The question that arises immediately is: If earning returns on winners is so easy, why don't smart investors take advantage of such anomalous returns? As Shleifer and Vishny (1997) pointed out, investors must know about an anomaly and be convinced of its existence before they will take action to construct trading strategies to exploit it. Perhaps, evidence related to tax-gain selling has been sparse and is not yet compelling enough for smart investors to act on it.

January Effect. On the face of it, exploiting the January effect would be even more attractive than exploiting the December effect. The return for high-PTS stocks was more than 10 percent over a five-day period in January, compared with 1.8 percent for low-PTS stocks in December. But profitable trades based on the January effect are not easy.

Table 4 shows that for 2000, the median market cap of losers was a low \$26 million. Therefore, because the main challenge with arbitraging the January effect is to keep transaction costs under control, we considered various financial instruments with the intent of minimizing transaction costs for stocks that are possibly very illiquid.

Consider individual stocks first: We bought the approximately 600 stocks in the bottom return

Table 6. Returns to Trading Strategies to Exploit the December Effect
(*p*-values in parentheses)

Period	S&P 500 Dec Return	S&P 500 Dec 5-Day Return	Futures Price at Nov End	Futures Price at 7th Last Day in Dec	Futures Price at 2nd Last Day in Dec	Futures Dec Return	Futures Dec 5-Day Return
1963–87	1.327% (0.046)	0.467% (0.084)				1.582% (0.274)	–0.379% (0.395)
1988	1.846	0.828	275.90	281.35	280.40	1.867	–0.338
1989	2.269	2.337	351.80	347.90	354.95	1.336	2.026
1990	2.793	–0.381	327.20	332.75	331.55	1.161	–0.361
1991	11.430	7.359	377.60	388.35	416.40	10.752	7.223
1992	1.339	–0.256	432.20	441.95	439.50	1.168	–0.554
1993	1.219	0.377	463.20	468.90	469.70	0.842	0.171
1994	1.483	0.409	457.05	464.80	464.40	0.996	–0.086
1995	1.783	1.373	612.50	612.80	618.20	0.971	0.881
1996	–1.984	0.688	764.90	757.00	758.70	–2.634	0.225
1997	1.644	1.814	965.80	962.90	979.40	1.284	1.714
1998	5.875	2.415	1,174.00	1,215.50	1,242.00	6.133	2.180
1999	5.950	2.019	1,410.80	1,457.00	1,480.00	5.189	1.579
2000	0.484	5.511	1,341.20	1,279.60	1,353.20	–0.462	5.752
2001	0.887	1.849	1,141.50	1,142.30	1,159.30	0.675	1.488
1988–01	2.644 (0.009)	1.882 (0.006)				2.091 (0.032)	1.564 (0.025)
1963–01	1.788 (0.001)	0.962 (0.001)				1.939 (0.013)	0.981 (0.058)

Notes: Returns are for the S&P 500 and the March S&P 500 futures contract.

decile of all stocks on the last trading day of December and sold them on the fifth trading day of the following January at the close. Assuming a minimum spread of 1/16 and a median stock price of \$1.14 (see Table 4), the quoted spread would have accounted for a cost that is greater than 5 percent. In addition to the spread, the low trading volumes in most small-cap stocks imply that large investors can take only trivial positions for fear of moving the price against them. And they would have to trade several hundred stocks to obtain the “average” return from the January effect. Small investors might be better equipped to trade small quantities, but these investors might not have the expertise or the resources to exploit the anomaly (see Shleifer and Vishny). Thus, trading individual stocks to exploit this anomaly is very difficult.

Index futures provide an alternative in cases where the spreads are small and high volumes can be easily absorbed. Because the median January effect stock is in the bottom third of all stocks, a futures contract that tracks small-cap stocks in the bottom third of the universe would be needed. None of the popular indexes, such as S&P 500, Russell 1000, or Russell 2000, tracks any stocks that are *not* in the top half. The only index that tracks the universe of U.S. stocks is the Wilshire 5000, which currently consists of 6,000 stocks. Unfortunately, the Wilshire 5000 is not traded on futures markets. Thus, index futures do not provide an opportunity to gain from the January effect.⁹

Mutual funds provide an alternative to stocks and futures and have lower transaction costs than stocks or futures. Unfortunately, none of the mutual funds fit our requirements—either they held too many stocks or they held stocks that were too large. Total market funds, such as the Vanguard Total Market Fund, hold about 3,500 of the largest-cap stocks and do not include any of the small-cap stocks. The Vanguard Total Market Fund’s weighted market cap is \$32.5 billion, much larger than our objective of a \$26 million median market cap. Perhaps, the best fit would be the DFA U.S. Micro Cap portfolio (formerly U.S. 9–10 Small Company portfolio), which claims to invest in the “smallest 4 percent of the market universe.” It holds 3,100 stocks, however, that span the entire bottom 50 percent of the market. As a result, the average five-day January return for this fund over the most recent 11-year period was 1.00 percent, compared with 10.8 percent for the January effect stocks. Although the DFA U.S. Micro Cap portfolio can capture part of the January effect, the remaining 90 percent of the effect is untouched. Other small-cap stock mutual funds consist of much

larger stocks, precluding trading strategies to arbitrage the January effect.

Finally, options might provide an alternative. Options are available for only about 2,500 stocks out of a universe of 6,000 stocks and typically do not exist on small-cap stocks. Furthermore, the minimum strike price for options is \$5, which is much higher than the median stock price of \$1.14 for the January effect stocks. Therefore, options are unlikely to be available for a significant portion of the January effect stocks.

Although arbitraging a significant part of the January effect is not possible, investors *could* use this knowledge to change their own trading patterns. Instead of selling losers in December, they should wait until January. The cost of paying taxes a year earlier is much less than the expected appreciation of the stocks they hold. An example will illustrate this truth: If an average loss of 65 percent and the new capital gains tax rate of 15 percent are assumed, the tax benefit is almost 10 percent. Postponement of realization of this tax benefit by one year will cost the investor 1.0 percent at a 10 percent interest rate. The January effect of about 10 percent easily exceeds this loss because of postponement. Similarly, investors should advance their purchases, if any, of small-cap stocks from January to December. A change in trading patterns could reduce the January effect. Research shows that widespread use of such strategies, however, has not occurred. For example, Ritter found that sells far exceed buys in December for small-cap stocks and the pattern reverses in January.

Our analysis of various trading strategies to capture the January effect reveals that the best possible trading strategy can obtain only about 10 percent of the January effect. The bulk of the January effect cannot be arbitrated using conventional financial instruments—which may explain the persistence of the January effect.

Conclusion

We documented that investors postpone tax-gain selling of winners from December to January. The reduction in selling pressure on winners possibly causes them to earn a return of about 1.8 percent in the last five days of December, which is the December effect. The December effect is easy to exploit through simple trading strategies, such as using S&P 500 futures or SPDRs. After transaction costs, the net return in the 1988–2001 period would have been at least 1.5 percent for the five-day December period. Assuming that the December effect is real, its persistence can be attributed to limited knowledge about its existence.

We also reconfirmed the existence of a January effect for small-cap stocks. We concluded that the January effect persists because it cannot be cap-

tered. The market lacks a low-transaction-cost instrument for trading small-cap stocks.

Notes

1. See, for example, Browning (2001).
2. As pointed out previously, comparisons based on the methodology behind Tables 1 and 2 are not entirely correct because the portfolios were different.
3. The turnover of large losers and small winners is not significantly different between December and January.
4. The period used for computation of the PTS has varied in the past from about six months (Poterba and Weisbenner 2001) to about one year (Sias and Starks; Roll 1983).
5. We excluded the last trading day of the year because researchers disagree about whether that day should be included in December or January. One reason for exclusion is that the trading on the last day of the year is generally abbreviated as a result of New Year's Eve. Moreover, Keim (1989), Roll, and Reinganum found that the January returns result mainly from the first four or five days in January. Roll and Keim also found that significantly positive returns start on the last trading day of the year. Poterba and Weisbenner and Roll included the last day of December in January, whereas Sias and Starks did not; Ritter excluded it altogether, as we have done.
6. The stock price may not fall with a fall in market cap if the company engages in a reverse split, but reverse splits are rare.
7. See Singal (2003) for further discussion of implementing these trading strategies.
8. The difference in the returns to SPDRs and futures may be attributable to differences in closing times.
9. Haugen and Jorion (1996) suggested the use of Value Line Index futures to capture the January effect, but the median market cap of the stocks in the Value Line Index is \$1,510 million—much larger than the \$26 million median market cap of the January effect stocks. Thus, even the Value Line futures contract fails to span the stocks to be traded for the January effect.

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